ENGINEERING ABSTRACTS

CAM TYPE OF AVIATION ENGINE

A cam type of aviation engine has recently been introduced into the aeronautical world by Harold Caminez. Caminez does away with the crankshaft, timing gears, and connecting rods necessary in the conventional type of engine, thus eliminating many parts and making the engine very simple in its construction. In place of the crankshaft the engine uses a cam and roller mechanism through which the power is applied directly from the cylinders to the propeller shaft. The mechanism is such that each piston completes a power stroke with each revolution of the cam instead of every second revolution as in crankshaft engines. This makes it possible to obtain a high power output at slow propeller speed, thereby permitting the use of a propeller of great efficiency. Because of the slow propeller rotation, simplicity in construction, the perfect balance, low head resistance and frontal area, and its adaptability to air cooling, this type of aircraft engine has many advantages.— *Aero Digest.*

ATOMIC HYDROGEN WELDING

Atomic hydrogen welding, making possible the welding of many special alloys and the production of ductile welds in iron and steel, is now made practicable by the use of equipment placed on the market by the General Electric Co. This method utilizes the passage of a stream of hydrogen through the arc between the two electrodes. The heat of the arc breaks up the hydrogen molecules into atoms. These combine again a short distance beyond the arc into molecules of the gas, and in so doiing liberate an enormous amount of heat.

The welding outfit consists of (1) a single phase transformer for converting the voltage of a 60 cycle source of power to one suitable for welding equipment; (2) a specially designed variable reactor to provide the proper welding current and voltages for different classes of work, and (3) the welding torch. The latter consists of a holder supporting two tungsten wire electrodes each supported inside a nozzle; the hydrogen gas is forced out around the electrodes to the work to be welded. The circuit is completed from one electrode to the other.— *Engineering News-Record.*

THE HUDSON RIVER VEHICULAR TUNNEL

The opening of the great tunnels for the exclusive use of automobile traffic beneath the Hudson River is an event of prime importance in the world of Civil Engineering; for not only in respect to its diameter capacity is this the greatest tunnel in the world, but it called for absolutely sure solution of an unprecedented problem of ventilation, since each tunnel would receive exhaust gases of 1900 vehicles per hour. The problem of ventilation has been taken care of so completely that during the demonstration with smoke bombs, at the experimental tunnel, it was found that, although the smoke was so dense that the men could not see their hands in front of their faces, the smoke did not spread more than thirty feet on either side of the source of the smoke.

The tunnels are 8500 feet long between the portals and each has a roadway 20 feet wide with a clear headroom of 13 feet 6 inches. The exterior diameter is 29 feet 6 inches. The tunnels are lined internally with concrete. The side walls are tiled with a vitreous white tile, and the roadways are paved with granite block.— *Scientific American.*

POWER PLANT TO GENERATE 1,000,000 KILOWATTS

The East River Generating Station of the New York Edison Company will eventually supply 25 cycle current at 11,400 volts to the Edison System, and will also provide a means of tying in the Edison 25 cycle System with the United Electric Light and Power Company and the Brooklyn Edison Company's 60 cycle systems, through large frequency changers.

When completed, the plant will occupy an area 1092 feet long by 206 feet wide. The property affords suitable accommodations in the main structure for nine steam turbines; the first two already installed, have a capacity of 60,000 kilowatts each. Succeeding units will probably be of larger size, as 150,000 kilowatt single shaft units can be accommodated, bring the ultimate capacity of the plant to over a million kilowatts. Many unique and epoch-making improvements in the steam generating equipment will make this plant one of the most efficient at the present time.— *Scientific American.*

NEW CHEMICAL ELEMENT OBTAINED IN PURE FORM

Rhenium, the chemical element whose discovery was recently announced by Doctors Walter and Ida Noddack, has now been obtained in pure form. The first discovery was based on the finding of the characteristic lines in the X-ray spectrum as detected by photographic plates. Now the Noddacks have succeeded in obtaining, after long and difficult refining processes, a small quantity of the substance itself.

They describe it as a black powder of high melting point, that unites readily with a number of other elements. In an atmosphere of pure oxygen it ignites, forming a white oxide.

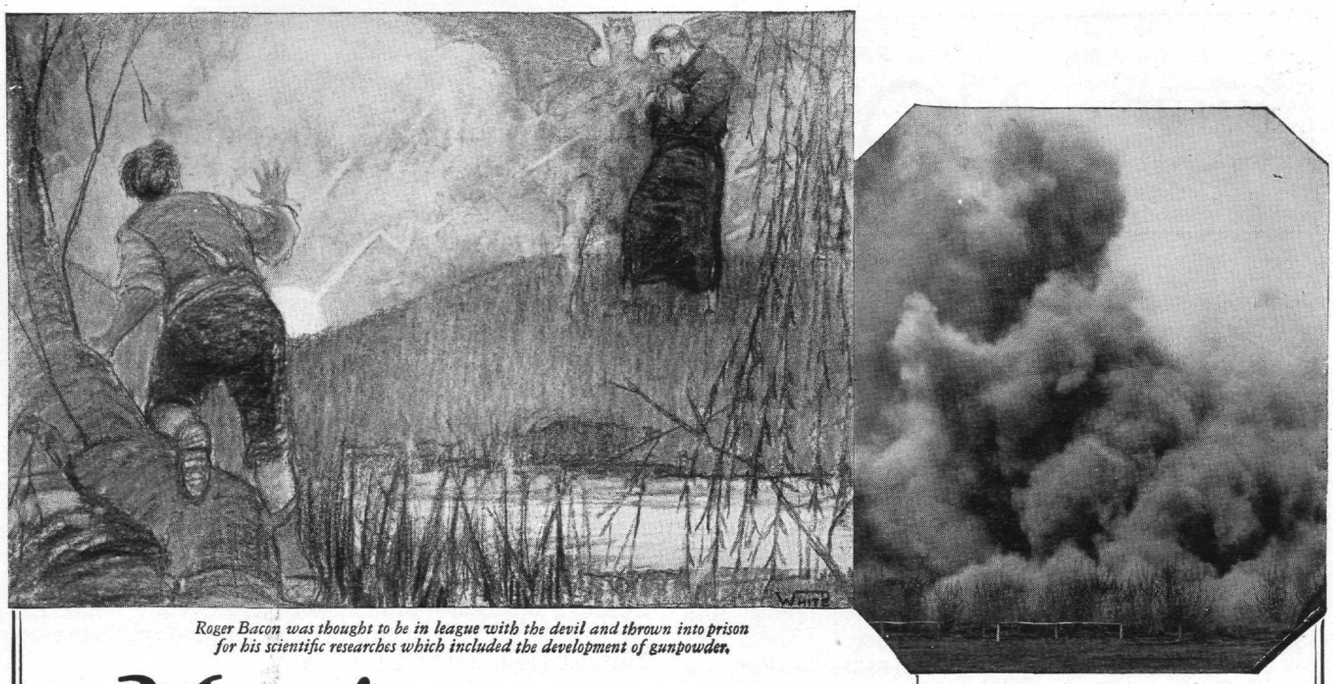
The quantity so far obtained is very minute, only two milligrams. The experimenters are now at work to separate more of it, which will permit exact quantitative chemical examination.— *Science Service.*

MAGNETIC HIGHWAY NAIL PICKER

A set of specially designed electro-magnets mounted on a truck and carried about two inches from the surface of the highway, was used to remove nails and other magnetic material from highways in the vicinity of Pullman, Washington.

Two 4-foot magnets were used, sweeping in strips 8 feet wide and operated by current from a gasolene engine driven generator mounted on a truck. Each magnet is strong enough to pick up a loose nail at a distance of six inches or more. As the magnet is carried within two inches of the ground during sweeping operations, it picks up

(Continued on Page 22)



Roger Bacon was thought to be in league with the devil and thrown into prison for his scientific researches which included the development of gunpowder.

Magic— Old and New

A LITTLE less than six hundred years ago, Europe learned of gunpowder. Friar Roger Bacon, the "admirable doctor" of thirteenth-century England, a Franciscan monk who was finally thrown into prison for commerce with Satan, mixed saltpetre, sulphur and charcoal, and made "thunder and lightning" to his own great entertainment and his neighbors' terror. The worthy friar did not put gunpowder to more practical use than magic. It never occurred to him that, confined, the gases from a flash of powder would exert great force that could be applied to many purposes of war and peace. It was not long, however, before someone stripped away the supernatural, and in 1346 firearms are said to have made their appearance, at the battle of Crecy. Equally early, gunpowder must have been applied to blasting purposes.

From this humble and quaint monastic beginning, explosives have steadily increased in use and importance. Chemistry has made one improvement after another. Engineering has found a multiplicity of new uses. Hercoblasting is an example in point.

E. M. Symmes, an explosives chemist of the Hercules Powder Company, devised a new blasting method by which Friar Bacon might have performed real miracles for his gaping contemporaries. It is called Hercoblasting. And it consists of column-loading black blasting powder of special granulation in well-drill holes and firing with Cordeau-Bickford detonating fuse. Where this method is applicable, it has accomplished remarkable results at great savings.

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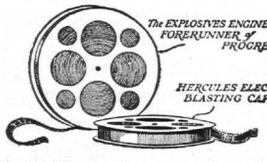

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ENGINEERING ABSTRACTS

(Continued from Page 12)

nails which are covered by loose gravel or partially imbedded in the road surface.

Quantities of nails and other iron and steel pieces were picked up, including spark plugs and a speedometer chain. The equipment was designed and assembled by H. J. Dana of the Engineering Experiment Station, State College of Washington, Pullman, Washington.— *Engineering News-Record.*

THE NEW PACKARD "X" ENGINE

The Packard Motor Car Company of Detroit, Michigan, recently completed what is claimed to be the largest airplane engine in the world. This engine developing 1250 h.p. at 2700 r.p.m. has many possibilities, of which the most imminent is to brink back to the United States the world high speed records for land and sea planes.

Capt. L. M. Woolson of the Packard Motor Car Company is the designer of the engine. Actually the new engine is two 12-cylinder Packard V-1500 engines on one crankshaft, one inverted and the other upright, giving a 24-cylinder engine of the X type. The displacement is 2775 cu. in. with a bore of 5⅜ inches and a stroke of 5 inches. The weight dry is 1402 lbs. or 1.122 lb. per h.p.

GALVANIZED JUSTICE

A chap was arrested for assault and battery and brought before the judge.

Judge (to prisoner): "What is your name, occupation, and what are you charged with?"

Prisoner: "My name is Sparks. I am an electrician, and I am charged with battery."

Judge (after recovering his equilibrium): "Officer, put this guy in a dry cell."